

REMARKS

Applicants thank the Examiner for the thorough consideration given the present Application. Claims 1-22 are pending in this Application. Claims 1 and 2 are independent.

Claim Rejections – 35 U.S.C. § 103 Satou and Hammerquist

Claims 1-3, 5 – 11, and 13 stand rejected under 35 U.S.C. § 103(a) as being anticipated by U.S. Patent 6,380,884 to Satou et al. (hereafter “Satou”) in view of U.S. Patent 5,280,294 to Hammerquist (hereafter “Hammerquist”). Insofar as it pertains to the presently pending claims, this rejection is respectfully traversed.

Prior Art

Satou teaches a radar apparatus that “groups detected reflected locations into a group of single or plural reflected locations” and “extracts reflected locations having the shortest distance from the moving body from among these grouped reflected locations.” (Abstract). Specifically, Satou teaches “a line segment extraction device that extracts from the arrangement of the grouped reflected locations line segments that form a profile of the object.” (Col. 3, lines 1 – 6). Satou further states that “any suitable method can be adopted to carry out this grouping” (Col. 5, lines 35 – 46).

Hammerquist is relied upon to teach passive monopulse antenna array with a beam forming and switching matrix that allows for the detection of multiple monopulse beam pairs. (Col. 5, lines 20 – 25).

Claim 1

Independent claim 1 pertains to a radar device that contains “a direction integrating unit for ... calculating an integrated direction ... from an area in which the density in a distribution of the plurality of primary directions is a predetermined value or greater.” Claim 1 also requires a “direction calculating unit for calculating a primary direction, being the direction of a target,

from a combination of ... at least two beams that partially overlap.” The output of the direction calculating unit is the input for the direction integrating unit of independent claim 1.

No Direction Integration in Satou

Applicants respectfully submit that insofar as Satou teaches calculating a direction of a target object, Satou’s teachings only correspond to the direction calculating unit of independent claim 1. Specifically, Satou teaches taking individual reflections from individual, overlapping beams (Figs. 1, 6, 10-12, Col. 6, line 65 – Col. 7, line 6) and, after filtering the any possible signal overlap out to have only the reception signal of the individual beam (Col. 7, lines 50 – 55), grouping the signals and creating an outline of an object based on those signals to determine a leading edge or protruding portion of the target (Col. 5, line 64 – Col. 6, line 5). Satou therefore “calculates a primary direction, being the direction of a target” (the leading edge or protrusion) “from a combination of [signal intensities of] the reception waves from at least two beams that partially overlap” (drawing line segments to create an outline between the individual intensity signals; applicants submit that filtering out signal from overlapping beams to obtain only the reflection from a single beam is the exact opposite of “combination”).

Applicants respectfully submit that a teaching and discussion of subsequently “calculating an integrated direction” from a plurality of primary directions is completely missing from Satou. Once Satou determines, by combining the individual signal intensities in a given group, whether or not part of the target object interests the path of a vehicle carrying Satou’s RADAR system, the teaching ends. Satou does not go on to teach or suggest subsequently “calculating an integrated direction” from any potential primary direction(s) (portions of target objects in the vehicle path) determined by combining (connecting with line segments) the reception waves from individual, overlapping radar beams. Satou does not even suggest that such a plurality of primary directions may exist for a target object, much less what to do with them. Applicants therefore respectfully submit that Satou does not teach or suggest “a direction integrating unit” as required by independent claim 1.

Hammerquist Does Not Remedy Satou's Deficiencies

With respect to Hammerquist, Applicants respectfully submit that Hammerquist's teachings also pertain only to the direction calculating unit of the present invention. Specifically, Hammerquist teaches calculating the primary directions of an active radar emitter and an illuminated target, and then determining a range and an angle difference between the emitter and the illuminated object (Abstract; Fig. 3). Hammerquist does not discuss or otherwise consider the notion of an integrated direction, which represents the direction of a single target or target area, determined from multiple primary directions, which each represent a potential target or target area. Applicants submit that Hammerquist fails to teach or suggest "calculating an integrated direction" from a plurality of primary directions. Applicants respectfully submit that Hammerquist is therefore not relied upon, nor can it properly be relied upon, to remedy the deficiencies of Satou with respect to independent claim 1.

Claim 2

Independent claim 2 pertains to a radar device that contains "a direction integrating unit for calculating an integrated direction ... from an area in which the density distribution of the reception-wave characterizing quantities used in calculating the plurality of primary directions is a predetermined value or greater." Applicants respectfully submit that insofar as Satou does not teach or suggest calculating an integrated direction from a plurality of primary directions, Satou cannot teach or suggest using "the reception-wave characterizing quantities" of the primary directions for calculating this same integrated direction. Applicants therefore respectfully submit that Satou does not teach or suggest the direction integrating unit of independent claim 2 for at least the same reasons as set forth with respect to independent claim 1. Applicants further submit that Hammerquist does not cure the deficiencies of Satou with respect to independent claim 2 for at least the same reasons as set forth with respect to independent claim 1.

Claim 3

Dependent claim 3 further limits independent claim 1 by requiring that "the direction integrating unit forms a cluster from the primary directions belonging to an area in which the

density is a predetermined value or greater, and calculates the integrated direction in units of that cluster.” Applicants respectfully submit that insofar as Satou teaches grouping reflected waves into location groups, Satou states that “any suitable method can be adopted to carry out this grouping.” (Col. 5, lines 35 – 36). Satou goes on to provide examples of grouping based on relative position invariance between reflected signals in a given area over a certain time (Col. 5, lines 37 – 50) and grouping based on relative velocity invariance between reflected signals in a given area (Col. 5, lines 52 – 63). Satou does not mention or suggest any form of reflected signal grouping based on the density of reflected signals within a given area, and even Fig. 3 shows spaces between signals inside a ‘box’ wider than the actual space between the two ‘boxes’. Applicants therefore respectfully submit that, in addition to the deficiencies of Satou with respect to independent claim 1, Satou also fails to teach grouping any kind of reflected signals or calculated directions into “a cluster from the primary directions belonging to an area in which the density is a predetermined value or greater” as required by claim 3.

Claim 11

Dependent claim 11 further limits independent claim 2 by requiring that “the direction integrating unit obtains the density in a distribution of the reception-wave reception amplitude used in calculating the primary direction, and outputs as the integrated direction the angle where the distribution density is locally maximum.” Applicants respectfully submit that Satou is deficient in its teaching with respect to claim 11, in addition to its deficiencies with respect to independent claim 2, for at least the same reasons as set forth with respect to dependent claim 3. Specifically, Applicants submit that Satou does not teach or suggest density distribution analysis of reception-wave amplitudes or signal intensities. Applicants further submit that Satou makes no mention or suggestion of identifying local maximum density in the distribution of reception-wave amplitude associated with a primary direction (i.e. not the local maximum signal intensity, but the local maximum in the density distribution of signal intensities). Applicants therefore respectfully submit that, in addition to Satou’s deficiencies with respect to independent claim 2, Satou also fails to teach or suggest obtaining “the density in a distribution of the reception-wave reception amplitude used in calculating the primary direction” as required by claim 11.

Claims 5-10 and 13

Applicants respectfully submit that claims 5-10 and 13 are allowable at least by virtue of their dependency from independent claims 1 and 2 and any claims depending therefrom.

Summary

Applicants respectfully submit that Satou deficient with respect to teaching a “direction integrating unit” as required by independent claims 1 and 2, and that Satou is further deficient with respect to teaching density distribution analyses as required by dependent claims 3 and 11. Applicants further submit that Hammerquist does not remedy the deficiencies of Satou with respect to independent claims 1 and 2. At least in view of the above, Applicants respectfully submit that both Hammerquist and Satou, taken either alone or in combination (assuming the references may be combined, which Applicants do not admit), are deficient in their teaching with respect to independent claims 1 and 2 and any claims depending therefrom. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Claim Rejections – 35 U.S.C. § 103 Yamada

Claims 4, 12, 14-18 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Satou in view of Hammerquist in further view of U.S. Reissued Patent RE37725 to Yamada (hereafter “Yamada”). This rejection is respectfully traversed.

Claim 12

Claim 12 further limits claim 11 by requiring that “the direction integrating unit obtains the distribution density by setting a window function for smoothing the reception wave amplitude.” The Office Action admits that neither of Satou nor Hammerquist teach this claim limitation and instead relies on Yamada for this particular teaching. Applicants respectfully submit that Yamada makes no teaching or suggestion regarding how reception wave amplitude is smoothed, and further that Yamada does not teach or suggest the use of a window function.

A “window function” is a function that is zero-valued outside some chosen interval. Yamada merely teaches, after an “ideal” intensity pattern has been overlaid on and adjusted to the real signal intensity pattern of a beam sweep (Col. 5, line 64 – Col. 6, line 18), an analysis of determining how many degrees off-center the maximum reflected signal intensity is (and therefore what the angular position of the target with respect to the radar is). (Col. 7, line 41 – Col. 8, line 39). Applicants respectfully submit that Yamada does not teach or suggest smoothing or angle analysis based on a function that is zero-valued outside a chosen interval. Accordingly, Applicants respectfully submit that in addition to the previously discussed shortcomings of Satou and Hammerquist with respect to the claims that claim 12 depends from, Yamada fails to teach or suggest obtaining “the distribution density by setting a window function for smoothing the reception wave amplitude” as required by claim 12.

Claims 4, 14-18, and 20

With respect to dependent claims 4, 14-18, and 20, Applicants respectfully submit that these claims are allowable at least by virtue of their dependency on independent claims 1 and 2.

Conclusion

At least in view of the above, Applicants respectfully submit that none of Hammerquist, Yamada nor Satou, taken either alone or in combination (assuming the references may be combined, which Applicants do not admit), teach or suggest all the limitations of independent claims 1 and 2 nor any claims depending therefrom. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Claim Rejections – 35 U.S.C. § 103 – Claims 19, and 21-23

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Satou in view of Hammerquist further view of U.S. Patent 6,646,591 to Aker et al. (hereafter “Aker”).

Claims 21 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Satou in view of Hammerquist in view of Yamada in further view of U.S. Patent 5,729,465 to Barbaresco (hereafter “Barbaresco”).

Claim 23 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Satou in view of Hammerquist in view of Yamada in view of Barbaresco in further view of U.S. Patent 6,278,798 to Rao (hereafter "Rao").

These rejections are respectfully traversed.

With respect to dependent claims 19 and 21-23, Applicants respectfully submit that these claims are allowable at least by virtue of their dependency on independent claims 1 and 2. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Conclusion

In view of the above remarks, Applicants submit that the application is now in condition for allowance. Accordingly, an early and favorable action is respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Naphtali Y. Matlis (Reg. No. 61,592) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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